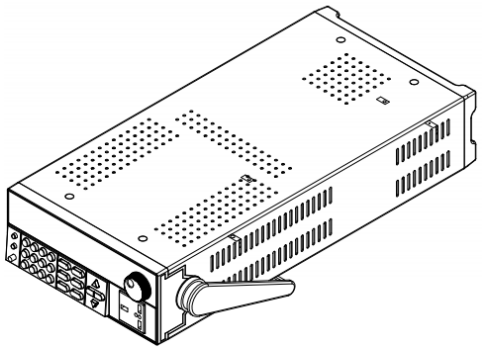
USER MANUAL

Programmable AC Power Supply
IT7300 Series
Model IT7321/IT7322/IT7324



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Ver1.3/Dec, 2013/ IT7320

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IT7320 Series Programmable AC Source

Security

Please do not install replacement parts in the instrument, or perform any unauthorized modification. Please send the instrument to our company's maintenance department for maintenance, to ensure its security features.
Please refer to the manual for specific information warning or precautions to avoid personal injury or equipment damage.
There is no part that the operator can maintenance. If maintenance service is required, please contact a trained service personnel.

Security regulation

To prevent electric shock, non-authorized personnel is strictly not allowed to open the machine.
This equipment is strictly prohibited for use in life support systems or any other device with security requirements.
We cannot accept responsibility for any direct or indirect financial damage or loss of profit that might occur when using the electronic load.

Safety symbols

Warning

It reminds the user, note some operating procedures, practices, conditions and other matters, that may lead to human casualties.

Notes:

It reminds the user of some operating procedures, practices, conditions and other matters that may result in instrument damage or data lose for ever.

Connect it to safety earth ground using the wire recommended in the user manual.

The symbol on an instrument indicates that the user should refer to the operating instructions located in the manual.

High voltage danger

Certification and Quality Assurance

IT7320 series programmable AC power supply fully meet all of the technical specification in the manual.

Warranty

Our Company gives one year warranty for the materials and manufacturing of the product since the date of shipment.

Warranty Service

For the warranty service or repair the product, the product must be returned to the designated maintenance units. Return the product to us for warranty service, the customer should pre-pay the one-way Freight to the maintenance department. and our company is responsible for the return shipping cost.
If products are returned from other countries for maintenance service, then the customer should pay all freight, duties and other taxes.

Guarantee limit

The guarantee does not apply to the damage caused by the following conditions:
Improper or inadequate maintenance to the products by customer;

- Customers use their own software or interface;
- Unauthorized modification or misuse;
- Operate this product not in the specified environment, or at the wrong place configuration and maintenance.
- Damage from customer self-installation of circuit, or defects due to customers use their products .
- Product model or serial number of the fuselage has been altered, deleted, removed or made illegible;
- Damage caused by accidents including but not limited to lightning, water, fire, abuse or neglect.

Notice

If the contents of this manual is subject to change, we will not notice additionally

Introduction

IT7320 series sets up the new standard for high performance AC power source.It equips with all powerful features such as power line disturbance (PLD) simulation, Dimmer and comprehensive measurement functions.With a compact and standard size of 2U.IT7320 series has built-in LAN/RS232/USB/GPIB communication interface (except IT7321, IT7321 is equipped with LAN/RS232/USB communication interface).These features make the IT7320 series ideal for commercial,power electronics and military test applications from bench-top testing to mass production.

Features:

- High accuracy and resolution
- Compact and standard size (300VA @ 2U)
- Programmable frequency:45HZ-500HZ
- Display Vrms,Irms,Ipeak,frequency,PF,apparent power and active power simultaneously
- IEC61000-4-11,IEC 61000-4-14,IEC 61000-4-28 voltage dips and frequency variation simulation
- Power line disturbance simulation capability
- Programmable voltage and current limit settings
- Dimmer function
- Turn on,turn off phase angle control(0-360°)
- TTL signal which indicates output transient
- Support front and rear panel output
- List mode to generate surge,sag and other line disturbance simulations
- Over-voltage,over-power,over-current,over-temperature protection features
- Built-in LAN,RS-232, GPIB and USB interface programming with SCPI command language.
- Memory capacity:10 groups

Mode	Voltage	Current	Power
IT7321	300V	3A	300VA
IT7322	300V	6A	750VA
IT7324	300V	12A	1500VA

Chapter1 Inspection and Installation

Power supply is a kind of high level safety equipment with a protected ground terminal. Before Installation or operation, please read the safety signs and instructions in this manual

1.1 Inspection

After receive the power supply, follow these steps to check:

1. Damage

When you receive your AC source,inspect it for any obvious damage that may have occurred during shipment.If there is damage,notify the shipping carrier and the nearest ITECH Sales and Support Office immediately.

2.Accessories

Make sure you receive the AC source and the following accessories at the same time, if any is missing, please contact your nearest support office.

□ a power cord (a power cord appropriate for your location)
□ a User's manual.
□ a factory calibration report
□ a USB cable

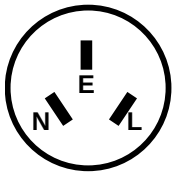
3. AC input

There are two kinds of mains input of IT7320 (110Vac and 220Vac).

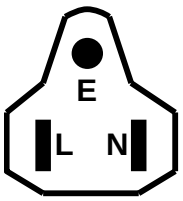
AC input level

110VAC ± 10%, 47 to 63 Hz
220VAC ± 10%, 47 to 63 Hz

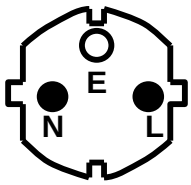
Power cord type



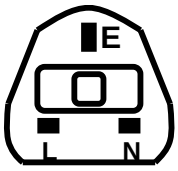
China
IT-E171



America,Canada
IT-E172



Europe
IT-E173



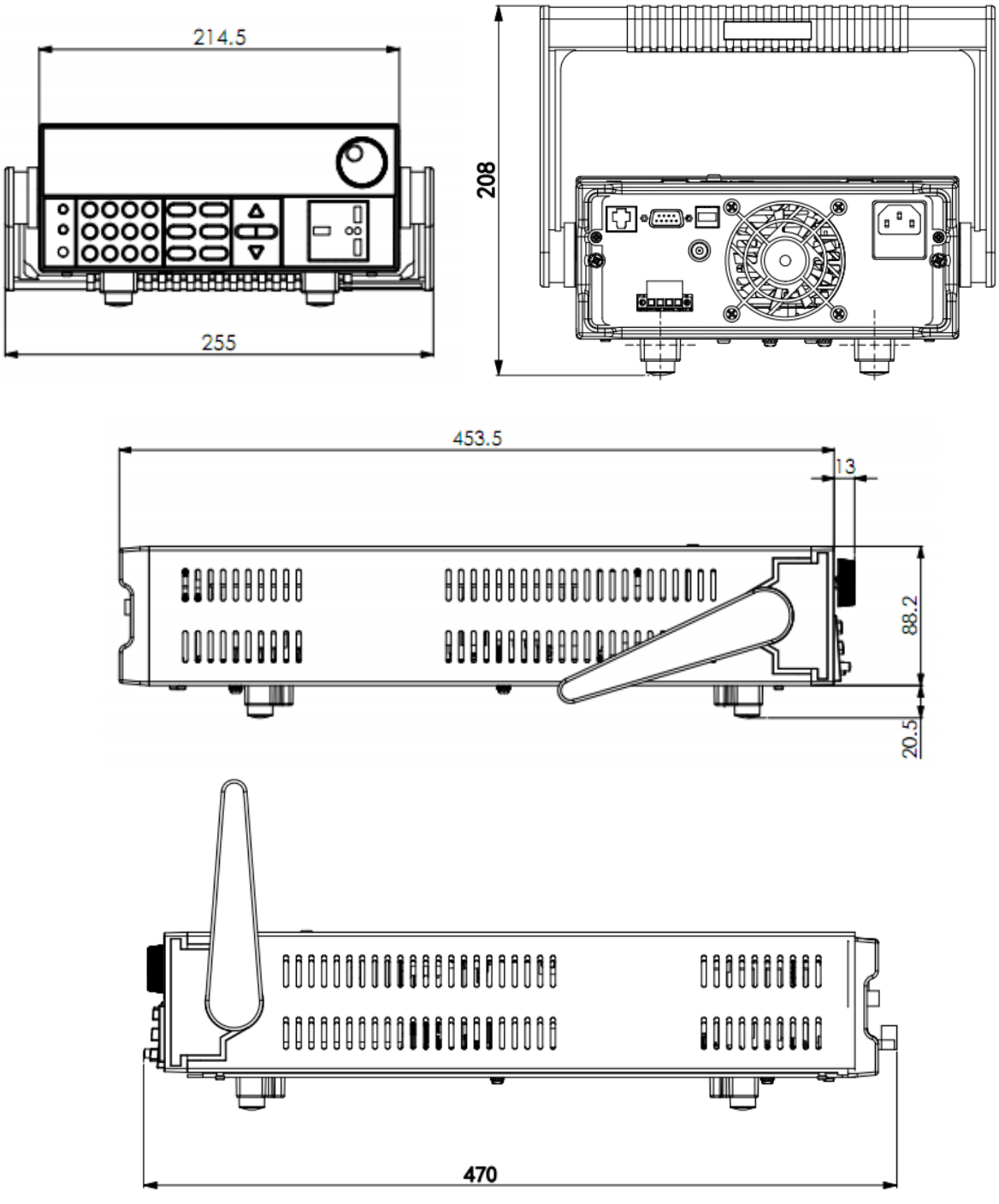
England
IT-E174

1.2 Dimension

1. IT7321 power supply's dimension:

214.5mmW×88.2mmH×453.5 mmD (W:width H:height D:depth)

* refer to the Dimension below:

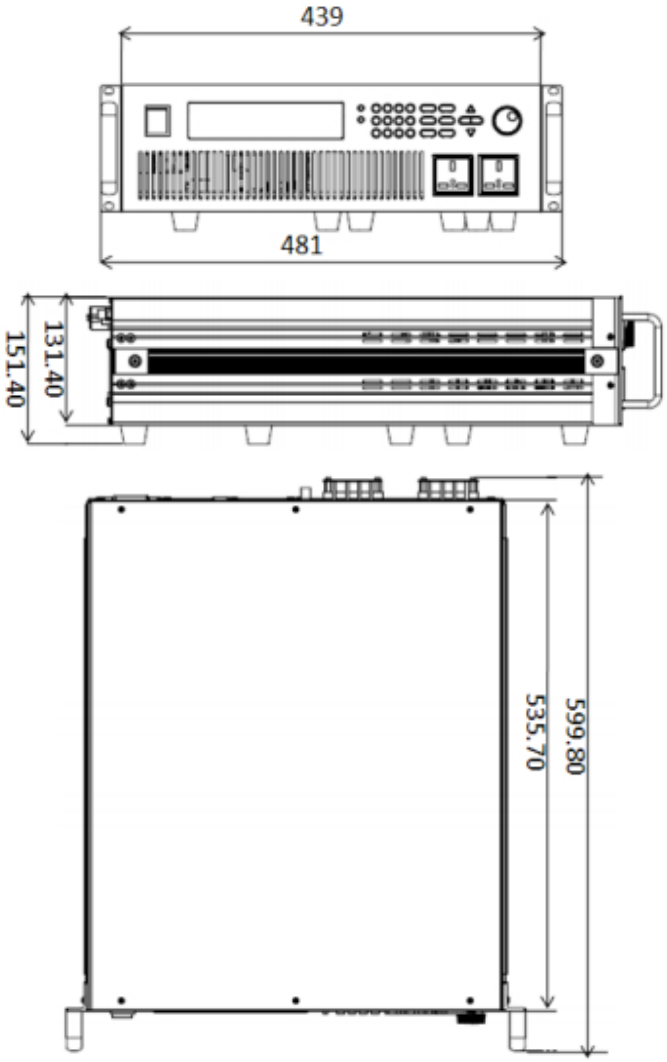


Unit: millimeter

2. IT7322/IT7324 power supply's dimension:

439mmW×131.4mmH×535.7 mmD (W:width H:height D:depth)

* refer to the Dimension below:



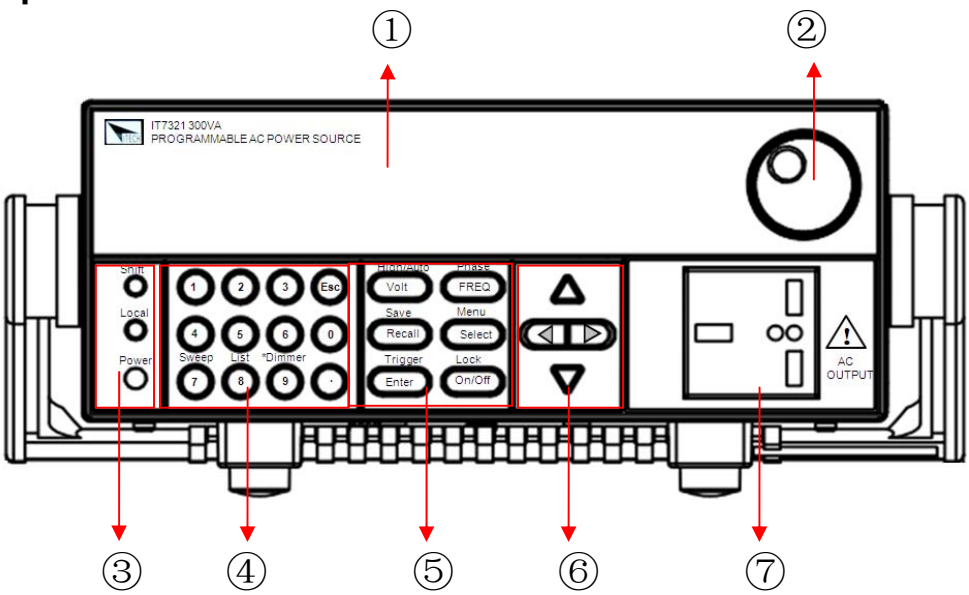
Unit: millimeter

Chapter2 Quick start

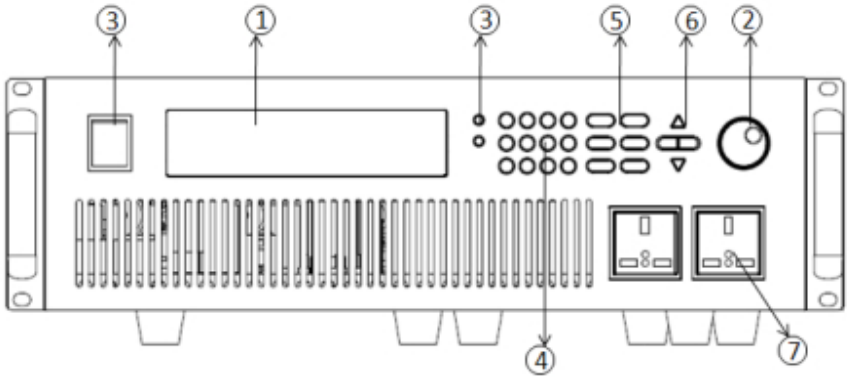
This chapter introduces the front panel, the rear panel, key functions and VFD display of the AC source.Make sure that you can quickly know the appearance, instruction and the key function before you operate the power supply, Help you make better use of IT7320 series.

2.1 Front and Rear Panel

The front panel of IT7321

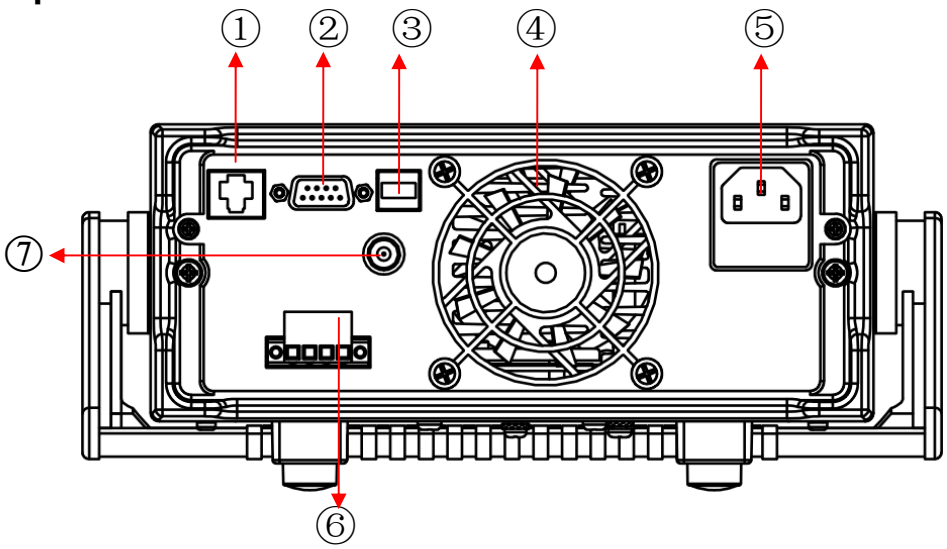


The front panel of IT7322/IT7324

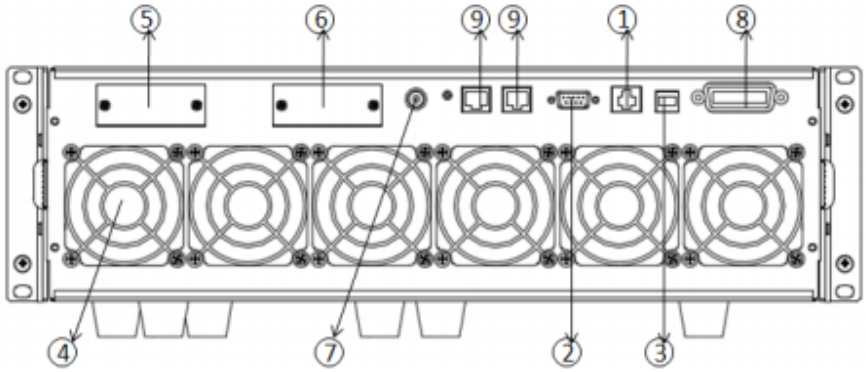


① VFD display
② Rotary knob
③Compound key, the local switch key and power switch
④ Numeric keys and ESC
⑤ Function keys
⑥UP, DOWN, LEFT and RIGHT key
⑦ Output terminals
⑧ Power button

The rear panel of IT7321

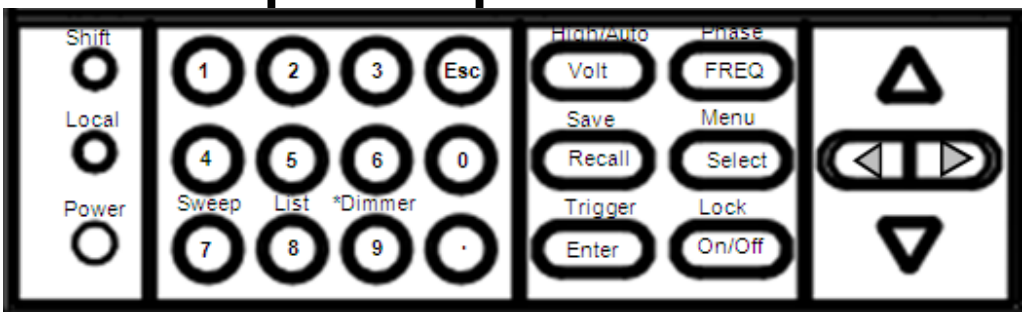


The rear panel of IT7322/IT7324



① LAN communication interface
② RS232 communication interface
③ USB communication interface
④ Cooling fans
⑤ AC power socket
⑥ Output terminals
⑦ BNC terminal
⑧ GPIB communication interface
⑨ System Bus

2.2 Front-panel Operation Overview



Key description, see the table below:

Keys	Name and the function
Shift	The shift key is used to select the alternate operation of a key,indicated by the word under the key
Local	Local buton, switch from remote mode to local operation mode
Power	Power on key
0-9	Numeric keys
7/Sweep	Number 7/Sweep function key
8/List	Number 8/List function key
9/*Dimmer	Number 9/Dimmer function key
Esc	Escape key.It can be used to exit keyboard entry or move up a level in the menu.
Volt /High/Auto	Set the voltage value/ Switch the voltage range between high range and Auto range mode
FREQ /Phase	Set the frequency /set the phase angle
Recall /Save	Recall the setup from internal memory/ Store the AC source settings in non-volatile memory.
Select /Menu	Switch the VFD display to be apparent power,peak current,active power and power factor/entry the menu setup
Enter /Trigger	Enter key, to confirm the number entered and operation/trigger button, which is used to trigger the List test
On/Off /Lock	Output on (off) keys, control power output state / keypad lock function keys, used to lock the panel buttons
◀ ▶	Left and right direction keys, used to set the value, to adjust the cursor to the specified location
△▽	Up and down keys, used to turnover the item in the menu or increase (decrease) the output voltage or current values

2.3 VFD Indicator Description

VFD indicator function description as follow:

Char	Function description	Char	Function description
OFF	Output is off	**Prot**	OVP/OTP/OCP/OPP Protection
Rmt	The AC source is in remote mode	**Auto**	Auto change the voltage range
SRQ	Service request	*****	Dimmer function is enabled
Error	The power supply has an error	**Shift**	Shift button is pressed
Trig	Awaiting for a trigger signal	**Lock**	Key operation is locked

Chapter3 Power on check

This chapter will introduce the procedure of power on check, including pre-check and output check, to make sure the IT7320 series AC source can power on and work normally on the original state.

3.1 power on checkout

Before operate the AC source, please read the following safety guide:

Warning: The power supply is shipped from the factory with a power-line cord that has a plug appropriate for your location. Your power supply is equipped with a 3-wire grounding type power cord; the third conductor being the ground. The power supply is grounded only when the power-line cord is plugged into an appropriate receptacle.

Warning: Use wire with appropriately rated load capacity of all load wires must be able to withstand the maximum short-circuit output current of the power without overheating. If there is more than one load, each load wire must be able to safely carry the power of full rated short-circuit output current.

Warning: In order to reduce the risk of fire and electric shock, make sure that the mains supply voltage fluctuations should not exceed 10% of the operating voltage range.

Note: In some cases, misconfigurated mains voltage for the instrument may cause the mains fuse disconnected.

Power on pre-check includes two parts: power on check and system self check.

3.1.1 Power on the supply

Use the following steps to help solve problems you might encounter when turn on the instrument.

1) Verify a good condition of Mains supply connection

First, verify that the power cord is firmly plugged into the power receptacle on the rear panel of the AC source. You should also make sure that the power source you plugged the AC source into is energized. Then, verify that the power supply is turned on.

2) Verify the power-line voltage setting.

The line voltage is set to the proper value for your country (220VAC or 110VAC) when the power supply is shipped from the factory.

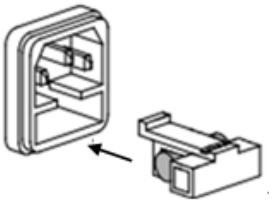
3) Verify that the correct power-line fuse is installed.

If the fuse was damaged, please replace the fuse with same specification for your power supply.

4) How to exchange the fuse

Remove the AC power cord and open the plastic cover located at the AC power inlet,then you will see the fuse.

Replace with a fuse of the same specification and install it.



3.1.2 System self-test

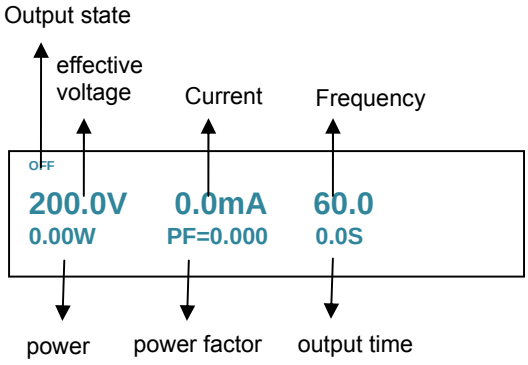
After power on,the VFD will display the BIOS version:

BIOS VER1.10

After 1s,it will change to display as below:

System Selftest…..

If the EEPROM was damaged or the latest operation data in EEPROM was lost, the VFD will display with a indicator light of “Error”.Access the menu could check the detailed error information.If everything goes well,VFD will display:



Note:Under the screen of displaying "ITECH IT7321",press On/Off button will quit the and entry the normal working screen.Or it will automatically done the same operation after 7s without any operation.

3.2 Output Checkout

The following procedures check to ensure that the AC source develops its rated outputs and properly responds to operation from the front panel.

The following steps verify basic voltage functions without load.

1) Turn on the AC source.
2) Press Volt and numeric key to set a effective voltage,press Enter to confirm
3) Press FREQ and numeric key to set the frequency， press Enter to confirm.
4) Press On/Off to turn on the output

Note:When On/Off button is lit which means the output is ON,Meanwhile indicator light of "OFF" on VFD will disappear.

5） check the output waveform with a oscilloscope
set different voltage and check wether the disiplayed voltage is close to setting voltage.

6） Ensure that the voltage can be adjusted from zero to the full rated value

Chapter4 Technical specification

This chapter will introduce the main technical parameters of IT7300,such as rated voltage/current/power and so on. Besides, this part will introduce the working environment and storage temperature.

4.1 Specification

Model		IT7321	
AC INPUT			
Input	Phase	1	
	Voltage	110Vac±10%;220Vac±10%	
	Frequency	47-63Hz	
	Max.Current	8A	
	Power Factor	0.5(typical)	
AC OUTPUT			
AC output	Max.Power	300VA	
	Max Current(rms)	3.0A(0-150V)	1.5A(0-300V)
	Max Current(peak)	12A (0-150V)	6A(0-300V)
	Phase	1Φ/2W	
	Total Harmonic Distortion(T.H.D)	≤0.5% at 45-500Hz (Resistive Load)	
	Crest Factor	≧4	
	Line Regulation	0.1% max for a ±10% line change	
	Load Regulation	≤0.5%FS (Resistive Load)	
	Response Time	<100uS	
SETTING			
Voltage	Range	0-300V, 150/300V Auto	
	Resolution	0.1V	
	Accuracy	±(0.2% +0.6V)	
Frequency	Range	45-500Hz	
	Resolution	0.1Hz at 45-99.9Hz 1Hz at 100-500Hz	
	Accuracy	0.1HZ	
Phase Angle	Range	*0*-360°	
	Resolution	0.1°	
	Accuracy	±1°(45-65Hz)	
READBACK			
Voltage	Range	0-300V	
	Resolution	0.1V	
	Accuracy	±(0.2% + 0.6V)	
Current(rms)	Range	L:120.0mA/ M:1.200A/ H:3.00A *	
	Resolution	L:0.1mA/ M:1mA/ H:10mA	
	Accuracy	L: ±(0.2%+0.4mA)/ M: ±(0.2%+4mA)/ H: ±(0.2%+20mA)	
Current(peak)	Range	0-12A	
	Resolution	0.01A	
	Accuracy	±(1% + 120mA)	

Power	Resolution	L:0.01W/ M:0.1W/ H:1W
	Accuracy	L: ±(0.2%+0.05W) (47HZ-65HZ)/ M: ±(0.2%+0.5W) (47HZ-65HZ) / H: ±(0.2%+2W) (47HZ-65HZ)
OTHER SPECIFICATION		
Memory		10 memories
Sync Output Signal		Output Signal 5V, BNC type
Interface		LAN, USB, RS232
Operation Environment		0-40℃/20-80%RH
Dimension		214.5mmW×88.2mmH×453.5mmD
Weight		9.5kg

Model		**IT7322**	
AC INPUT			
Input	Phase	1	
	Voltage	110Vac±10%;220Vac±10%	
	Frequency	47-63Hz	
	Max.Current	15A	
	Power Factor	0.7(typical)	
AC OUTPUT			
AC output	Max.Power	750VA	
	Max Current(rms)	6A(0-150V)	3A(0-300V)
	Max Current(peak)	24A (0-150V)	12A(0-300V)
	Phase	1Φ/2W	
	Total Harmonic Distortion(T.H.D)	≤0.5% at 45-500Hz (Resistive Load)	
	Crest Factor	≧4	
	Line Regulation	0.1% max for a ±10% line change	
	Load Regulation	≤0.5%FS (Resistive Load)	
	Response Time	<100uS	
SETTING			
Voltage	Range	0-300V, 150/300V Auto	
	Resolution	0.1V	
	Accuracy	±(0.2% +0.6V)	
Frequency	Range	45-500Hz	
	Resolution	0.1Hz at 45-99.9Hz 1Hz at 100-500Hz	
	Accuracy	0.1HZ	
Phase Angle	Range	*0*-360°	
	Resolution	0.1°	
	Accuracy	±1°(45-65Hz)	
READBACK			
Voltage	Range	0-300V	
	Resolution	0.1V	
	Accuracy	±(0.2% + 0.6V)	
Current(rms)	Range	L:120.0mA/ M:1.200A/ H:6.00A *	
	Resolution	L:0.1mA/ M:1mA/ H:10mA	
	Accuracy	L: ±(0.2%+0.4mA)/ M: ±(0.2%+4mA)/ H: ±(0.2%+20mA)	
Current(peak)	Range	0-24A	

	Resolution	0.01A
	Accuracy	±(1% + 120mA)
Power	Resolution	L:0.01W/ M:0.1W/ H:1W
	Accuracy	L: ±(0.2%+0.05W) (47HZ-65HZ)/ M: ±(0.2%+0.5W) (47HZ-65HZ) / H: ±(0.2%+2W) (47HZ-65HZ)
OTHER SPECIFICATION		
Memory		10 memories
Sync Output Signal		Output Signal 5V, BNC type
Interface		LAN, USB, RS232, GPIB
Operation Environment		0-40℃/20-80%RH
Dimension		439mmW×131.4mmH×535.7mmD
Weight		40kg

Model		**IT7324**	
AC INPUT			
Input	Phase	1	
	Voltage	110Vac±10%;220Vac±10%	
	Frequency	47-63Hz	
	Max.Current	30A	
	Power Factor	0.7(typical)	
AC OUTPUT			
AC output	Max.Power	1500VA	
	Max Current(rms)	12.0A(0-150V)	6A(0-300V)
	Max Current(peak)	48A (0-150V)	24A(0-300V)
	Phase	1Φ/2W	
	Total Harmonic Distortion(T.H.D)	≤0.5% at 45-500Hz (Resistive Load)	
	Crest Factor	≧4	
	Line Regulation	0.1% max for a ±10% line change	
	Load Regulation	≤0.5%FS (Resistive Load)	
	Response Time	<100uS	
SETTING			
Voltage	Range	0-300V, 150/300V Auto	
	Resolution	0.1V	
	Accuracy	±(0.2% +0.6V)	
Frequency	Range	45-500Hz	
	Resolution	0.1Hz at 45-99.9Hz 1Hz at 100-500Hz	
	Accuracy	0.1HZ	
Phase Angle	Range	*0*-360°	
	Resolution	0.1°	
	Accuracy	±1°(45-65Hz)	
READBACK			
Voltage	Range	0-300V	
	Resolution	0.1V	
	Accuracy	±(0.2% + 0.6V)	
Current(rms)	Range	L:120.0mA/ M:1.200A/ H:3.00A *	

	Resolution	L:0.1mA/ M:1mA/ H:10mA
	Accuracy	L: ±(0.2%+0.4mA)/ M: ±(0.2%+4mA)/ H: ±(0.2%+20mA)
Current(peak)	Range	0-48A
	Resolution	0.01A
	Accuracy	±(1% + 120mA)
Power	Resolution	L:0.01W/ M:0.1W/ H:1W
	Accuracy	L: ±(0.2%+0.05W) (47HZ-65HZ)/ M: ±(0.2%+0.5W) (47HZ-65HZ) / H: ±(0.2%+2W) (47HZ-65HZ)
OTHER SPECIFICATION		
Memory		10 memories
Sync Output Signal		Output Signal 5V, BNC type
Interface		LAN, USB, RS232, GPIB
Operation Environment		0-40℃/20-80%RH
Dimension		439mmW×131.4mmH×535.7mmD
Weight		40kg

*Description about the switch of current range:
When switch from low to high level(L to M,M to H) happened at the condition of Ipeak＞300%(Full rms),
When Ipeak>300%(Full rms),the current switch from low range to high range(L to M,M to H).
When Ipeak<20%(Full rms),the current switch from high range to low range(H to L).
When Ipeak<80%(Full rms),the current switch from high range to Middle range(H to M).

4.2 Supplementary parameters

Memory ： 10 groups

suggested calibrationfrequency: 1time/year

Radiating mode : Fans

Operation temperature: 0 to 40 °C

Storage temperature: -20 to 70 °C.

Humidity : Max humidity: 80%

Chapter5 Basic Operation

This chapter introduce the basic operations of IT7320 series AC sourece,including the following parts:

- Local/remote mode
- Voltage setup
- Frequency setup
- Phase angle setup
- Output on/off operation
- Switch the VFD display items
- Save/recall operation
- Trigger operation
- Menu operation
- Switch output voltage range
- Key lock function
- BNC terminals function

5.1 Local/Remote Mode

Press the local button to change the AC source from remote to local operation.

After you power on the AC source, it defaults in local mode, all buttons are enabled. While in remote mode, most buttons are disabled except Shift and Local keys.In addition, the mode modificaton will not effect the output parameters.

5.2 Voltage Setup

You can set voltage within the range of rated voltage value. When you press Volt button, the button will be lit. This indicates that you can set voltage. There are three ways to set output voltage through front panel.

The first way: press Volt ,adjust cursor location through ◀▶button, pressing △ and ▽ will enable you to increase or decrease the setting voltage value.

The second way: press Volt , adjust cursor location through ◀▶button, adjust rotary knob to change the setting voltage value.

The third way: press Volt button and numeric key(0 to 9) to set voltage value

5.3 Frequency Setup

You can set frequency within the range 45Hz to 500Hz. When you press FREQ, the button will be lit. This indicates that you can set frequency.There are three ways to set frequency through front panel.

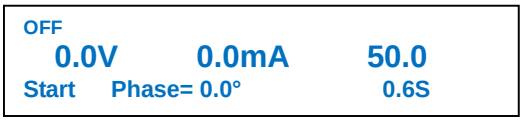
The first way: press FREQ ,adjust cursor location through ◀▶button, pressing △ and ▽ will enable you to increase or decrease the setting frequency value.

The second way: press FREQ, adjust cursor location through ◀▶button, adjust rotary knob to change the setting frequency value.

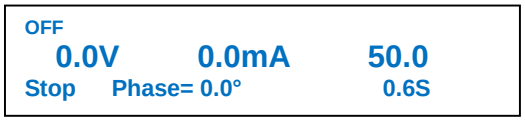
The third way: press FREQ button and numeric key(0 to 9) to set frequency value

5.4 Phase Angle Setup

You can set the starting and stop phase angle within range of 0~360° by pressing (Shift)+ FREQ (Phase),VFD will display as below:



Press numeric keys to set the starting phase angle and press Enter to confirm.Then the VFD will indicate next operation to set stop phase.



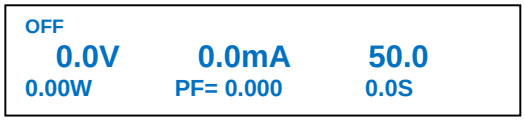
5.5 Output On/Off Operation

On/Off button is used to control the output state of AC source. When On/Off button is lit,.It indicates the output in on state.When output button is dark which means the output is turned off.

Note: make sure you have connected AC source and test DUT very well, then press On/Off button to minimize shock hazard.

5.6 Switch the VFD display items

Press Select button to change the VFD display of bottom line.
Default VFD display:effective voltage,effective current,frequence
Active power,power fator,output time



Press Select to switch the display: effective voltage,effective current,frequence
apparent power,peak current,output time

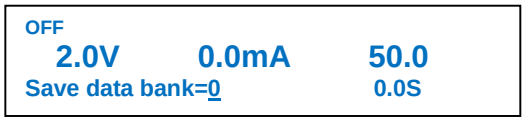
Notes: The time shown on the VFD is the output time of AC source. Press On/Off to start the timing when power is on; press On/Off again to turn off power. The duration of power supply will be displayed on the VFD until the next power starts when the timer will reset. The timing is based on the decimal system: when the time reaches 999.9 s, the timing will be displayed in minutes (m); when the time reaches 999.9 m, the timing will be displayed in hours (h).

5.7 Save and recall operation

IT7320 series AC source provides10 non-volatile registers to save instrument settings for recall later.Each operating state includes preset voltage, preset frequency, starting and stop phase angle, output range level and dimmer phase angle.
Press(Shift) + Recall (Save) key to recall /save settings.

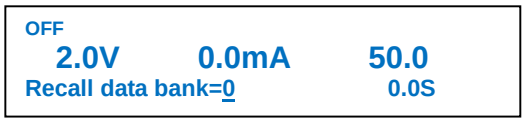
Save operation:

To save the instrument's settings to a register,press shift + Recall (Save).You'll be prompted for a register number.Enter a number between 0 and 9,then press the Enter key.The setting are saved.



Recall operation

press Recall button.You'll be prompted for a register number.Enter a number between 0 and 9,then press the Enter key.The setting are recalled.



5.8 Trigger operation

IT7320 series AC source has three kinds of trigger modes.They are Manual,BUS and EXTEN.

Trigger modes:

1) To use front panel trigger mode,first set the trigger source as Manual.Press shift +Enter (trigger) to start panel trigger mode.
2) The BNC trigger connectors on the rear panel let you apply trigger signals to the AC source.To use external trigger mode,first set the trigger source as EXTERN.
3) To use BUS trigger mode,first set the trigger source as BUS.Connect AC source by USB,RS-232 or LAN communication interface.When the TRIG command is received,the AC source will produce a trigger signal.

5.9 Menu Operation

5.9.1 Menu description

Press (Shift)+ Select （Menu）to enter menu.View the menu on the VFD,and use the direction keys or the knob to scroll through the complete menu listed below.Press Enter to enter the selected menu function,press ESC to return to the previous menu.

MENU			
System	**Init**	Initialize system menu	
	Power-On	POWER-ON PARAMENT	Set the Power ON/OFF state after power up.
		Sav0(Def)	The preset parameter stored in group 0
		Rst	Factory Default
	Power-Out	POWER-OUT	Power on state set
		Off(Def)	In the state of power off
		Last	In the state of latest power-off state
	Buzzer	BUZZER	Set buzzer state
		On(Def)	Buzzer on
		Off	Buzzer off
	Trigger	TRIGGER SOURCE	Trigger source selection.
		Manual（Def)	Manual trigger
		Bus	Bus trigger
		Extern	External trigger
	Communication	COMMUNICATION	Communication interface and parameter setting

		RS232(Def)	RS232	Select RS232 interface
			4800,8,N,1 9600,8,N,1 19200,8,N,1 38400,8,N,1 57600,8,N,1	Set Baud rate,data bit,odd-even check,stop bit and address
		USB	Select USB interface	
		LAN	LAN	Select LAN interface
			Gateway=192.168.0.1 IP=192.168.0.125 Mask=255.255.255.0 Socket Port=30000	Set gateway, IP address, mask address and port.
Config	**CONFIG**	Config menu		
	Volt-Min	Voltage lower limit		
		Volt-Min=0.0V	Set Min. voltage	
	Volt-Max	Voltage upper limit		
		Volt-Max=300.0V	Set Max, voltage	
	Freq-Min	Frequency lower limit		
		Freq-Min=45.0Hz		
	Freq-Max	Frequency upper limit		
		Freq-Max=500.0Hz	Set frequency upper limit	
	Irms-Protect	Current RMS protect point		
		Irms-Protect=12.000A	Set current RMS protect point	
	BNC-Set	BNC PORT SETUP		
		I-Trigger	Input interface for external trigger	
		I-On	Input interface for on/off control	
		O-Sync	Output interface for AC phase synchronization signal	
		O-On	Output interface for on/off state interface	
	Ipeak-Protect	Current peak protect point		
		Ipeak-Protect=12.000A	Set Current peak protect point	
	Dimmer	DIMMER	Phase dimmer	
		LeadingEdge	LeadingEdge Phase dimmer function	
		TrailingEdge	TrailingEdge Phase dimmer function	
		Off	Disable Phase dimmer function	
Info	**PRODUCT INFO:**	Power information		
	ERROR INFO:	For look up error information		
	PRODUCT INFO: IT7321 Ver:0.01~0.01	Instrument type/Firmware version		

5.9.2 Menu function

1. System menu

Initialize the system menu

relative factory default setup as follows:

Power-On	Sav0
Power-Out	Off
Buzzer	On
Trigger	Manual
Communication	RS232

Power-On

This parameter determines the state of the AC source after power up.If you select “Rst”,the default output parameter settings will be active after power up.The default setup is 0V,50HZ, 0° and 0°.If you select “Sav0”,then the AC source will automatically recall the output parameters setting saved in 0 register..

Note,please save these parameters in memory0 according to 5.7.

Power-Out

This parameter sets the output on/off state at power up.If you select “Last”,the AC source will save the output state prior to power down and revert to that state at power up.If you select “off”,the output state is always “OFF” when the power supply is turned on.The recommend setting is “OFF”.

Buzzer

This item can set the key sound state.If in ON mode,then when you press a button, the power supply will beep. If in OFF mode,the beeper will not make a sound.The default set is in ON mode.

Trigger source

The power supply supports 2 different trigger modes (Manual and Bus) for LIST test.

When Manual mode is enabled, you can generate an immediate trigger pulse by presing (Shift)+ Enter （Trigger）.When bus function is enabled, you can trigger the power supply by sending a Trigger command to the power supply.The default set is Manual

Communication

There are three types of communication interfaces available:RS-232,USB and LAN.You can choose any one of them to communicate with a PC.

RS232 interface

Avaiable baudate:4800, 9600, 19200, 38400, 57600, 115.2K

Data bit:8

Parity bit:NONE,ODD,EVEN

Address:0-31

LAN interface

Parameters need to be configured in LAN mode. Gateway, IP address, Mask address and socket port.

Before communicating with the principal computer, choose the communication port and perform associated configuration to ensure that communication configuration of the power accords with that of the principal computer.

2. Config menu

Volt-Min:	Voltage lower limit setting
Volt-Max:	Voltage upper limit setting
Freq-Min:	Frequency lower limit setting
Freq-Max:	Frequency upper limit setting
Irms-Protect:	Current RMS upper limit setting
Ipeak-Protect:	Peak Current upper limit setting

3. Instrument information

Step	Operation	VFD display
1	Press (Shift)+ Select （Menu）to enter menu operation	**MENU** **System Config Info**
2	press right direction key to select INFO,press Enter	**PRODUCT INFO:** **IT7321 Ver:0.06~0.06**

5.10 Function operation

5.10.1 Sweep

The Sweep function is used to test efficiency of switching power supply and capture the voltage and frequency at the maximum power point. The voltage and frequency of power may be altered in the form of step ladder by setting the initial voltage, final voltage, step voltage, initial frequency, final frequency, step frequency and one-step time. The one-step time may be indicated in seconds, minutes or hours. A maximum of 10 files may be stored. As the test closes, voltage, frequency and current at the maximum power point may be displayed.

> Edit sweep file

Note: In the following operations, up and down keys are used to turn over steps, but not to increase or decrease value.When up arrow appears in the lower left corner,you can press the up key to jump to the previous step.When down arrow appears in the lower right corner,press down key can entry the next step.

STEP	OPERATION	VFD DISPLAY
1	Press (Shift)+ (Sweep)to enter menu operation	**SWEEP** **Edit Recall Disable**
2	Press Enter to confirm when Edit is shining.	**START VOLTAGE** **Voltage= 0.0V**
3	Press number key or knob to set start voltage, press Enter to confirm	**END VOLTAGE** **Voltage= 0.0V**
4	Press numeric key or knob to set stop voltage, press Enter to confirm	**STEP VOLTAG** **Voltage=0.1V**
5	Press numeric key or knob to set step voltage, press Enter to confirm	**TIME UNIT** **Second Minute Hour**
6	Press left and right arrow keys to select time unit second, minute and hour, press Enter to confirm	**STEP TIME** **Time=2.0S**
7	Set step last time(0.1s~999.9s)，press Enter to confirm	**START FREQUENCY** **Frequency=50.0Hz**
8	Set start frequency(45Hz~500Hz), press Enter to confirm	**END FREQUENCY** **Frequency=50.0Hz**
9	Set stop frequency(45Hz~500Hz), press Enter to confirm	**STEP FREQUENCY** **Frequency=1.0Hz**
10	Set step frequency,press Enter to confirm	**SWEEP SAVE** **No Yes**
11	Press left and right arrow keys to select whether save sweeping file,” No” means do not saving ,” Yes” means saving.	**SWEEP SAVE** **Save data bank=0**
12	Select save position(0~9), press Enter to confirm, VFD display “SaveData success! “ for 1 second.	**SWEEP** **Edit Recall Disable**

>Recall sweep file

STEP	OPERATION	VFD DISPLAY
1	Press multiple keys (Shift)+ (Sweep) to menu operation	**SWEEP** **Edit Recall Disable**
2	Press right arrow key then press Enter key to confirm when Recall key is shining.	**RECALL SWEEP** **Recall Sweep=0**
3	Press numeric key to select needed recall file and press Enter key to confirm. VFD display “Recall Data success! “ for 1 second.	**SWEEP** **Edit Recall Disable**

> Set sweep test state and start test

STEP	OPERATION	VFD DISPLAY
1	Press multiple keys (Shift)+ (Sweep) to menu.	**SWEEP** **Edit Recall Disable**
2	Press right arrow key to “Disable”, press down arrow key and Enter to infirm when “Disable” is shining. the words”Sweep” appears at the right bottom,which means the Sweep function is active.	
3	Press On/Off key to start sweep test. Enter key will shining during test and will stop after that with power off automatically.	

To exit Sweep test function

STEP	OPERATION	VFD DISPLAY
1	Press multiple key (Shift)+ (Sweep) to menu operation.	**SWEEP** **Edit Recall Enable**
2	Press right arrow key to “Enable”, press down arrow key and Enter key to confirm and then exit sweep function(Sweep words will disappeared on lower right of VFD display)	

5.10.2 List operation

With List operation applied to the alternating power supply, alternating waveform sequences in various ranges may be output. The surge/trapped wave may be added as required to simulate fluctuation of network voltage so as to evaluate the test result of the instrument under such situation.

Various alternating sequences with output varied may be formed by listing the voltage, frequency, slope, surge/trapped wave each step.

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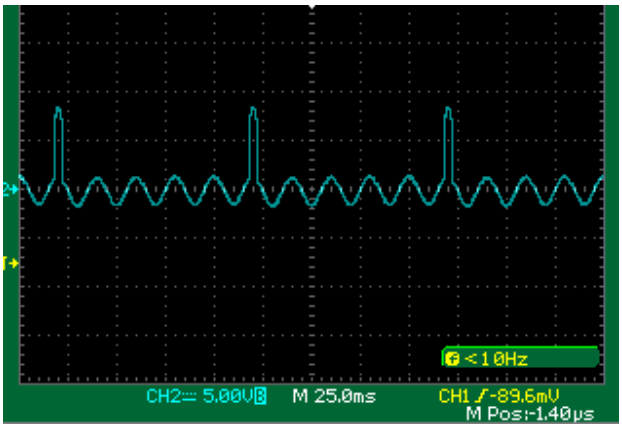


Surges wave

List sequences of IT7320 series can be stored into a non-volatile register,with a capacity of 100 steps.The user can edit up to 10 files.Following shows how to edit,recall and run a list file:

> Set Trigger Source

The surge/trapped wave test of LIST may be manually triggered to control the start time of the surge/trapped wave.

Operation:

(1)Press (Shift)+ Select (Menu) to entry the menu. Then the system will keep flickering------press Enter to confirm.

(2)Press right key to select Trigger.When selected,trigger item will be twinkling.Press Enter to confirm.

(3)Press right key to select Manual and press Enter to confirm.

>Edit LIST File

Steps	Operation	VFD display
1	Press (Shift)+ 8 (List) button,select Edit,press Enter to confirm.	**LIST** **Edit Recall Disable**
2	Press numeric key,set the step counts(range:1~100),press Enter to confirm.	**STEP COUNT** **Step Count=0**
3	Press numeric key,set number of cycles(range:1~1000),press Enter to confirm.	**LIST REPEAT** **List Repeat=0**
4	Set the first step voltage and press Enter to confirm.	**LIST VOLTAGE** **Step 0 Voltage=0.0V**
5	Set the first step frequency and press Enter to confirm.	**LIST FREQUENCY** **Step 0 Frequency=0.0Hz**
6	Set the slope(0.1~999.9),press Enter to confirm.	**LIST SLOPE** **Step 0 Slope=0.0S**
7	Set the time unit:S,min,hour,press Enter to confirm.	**DWELL UNIT** **Second Minute Hour**
8	Set delay time(0.1~999.9),press Enter to confirm.	**LIST DWELL** **Step 0 Dwell=0.0S**
9	Disable or enable the surges or trap state,press Enter to confirm.If select Disable,then do nothing for step10-step12.	**SD STATE** **Disable Enable**
10	Press left/right key to set whether create surges/wave traps continouly.If select Yes,power supply will create surges/wave traps in at intervals of 100ms.Press Enter to confirm.	**SD CONTINUE** **No Yes**
11	Press numeric keys to set voltage of surges/wave traps,press Enter to confirm.If set voltage is higher than current working voltage,then it is surges,or it is wave traps.	**SD VOLTAGE** **Step 0 Voltage=0.0V**
12	Set the starting time of surges/wavetraps,press Enter to confirm.With the restriction of frequency,the max settable time is 20ms.	**SD SITE** **Step 0 Site= 0ms**
13	Set the duration time of surges/wave traps.Press Enter to confirm.	**SD TIME** **Step 0 Time=0ms**
14	Repeat step4-13.	**LIST VOLTAGE** **Step 1 Voltage=0.0V**
15	NO:Do not save the list file,after power off the unit,current file will lose. Yes:Save list file to assigned memory room for quickly recall at any time.	**LIST SAVE** **No Yes**
16	Store file to specified storage space(0~9 groups),press Enter to confirm.VFD will display “Save data success!”	**LIST SAVE** **Save data bank=0**

> Set LIST State

steps	operation	VFD display
1	Press (Shift)+ 8(List) to entry the List menu.	**LIST** **Edit Recall Disable**
2	Press right key to select Disable,when it flicker,press up/down key to select Enable,and press Enter to confirm.Now the List mode is enabled.Escape menu,the front panel will display “LIST 0”.	**LIST** **Edit Recall Enable**

> Run LIST File

After enable the List mode,press On/Off to turn on the output,it will begin to run.Meanwhile,you will see Enter button keep flickering.The output will vary according to the edited steps.

Press On/Off button can quit the running state of List file.

> Quit LIST Mode

Steps	Operation	VFD display
1	Press (Shift)+ 8(List) to entry the List menu.	**LIST** **Edit Recall Enable**
2	Press right key to select Enable,when it flicker,press up/down key to select Disable,and press Enter to confirm.	**LIST** **Edit Recall Disable**

>Recall LIST Mode

When several List files are stored into the non volatile memory,user can recall the assigned file by Recall operation.

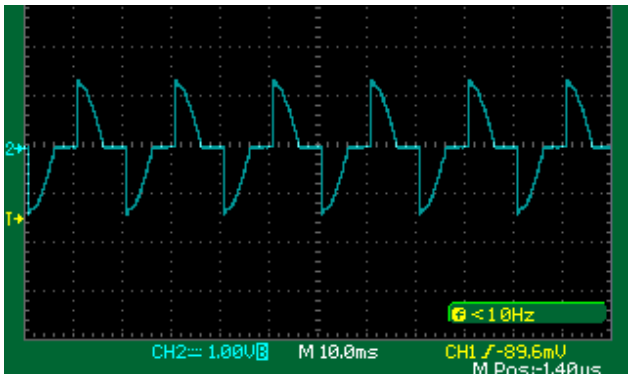
Steps	Operation	VFD display
1	Press (Shift)+ 8(List)button to entry the List menu	**LIST** **Edit Recall Disable**
2	Press right key to select Recall,when it flicker,press Enter to confirm.Press the file number to recall the assigned file.Press Enter to confirm.	**RECALL LIST** **Recall List=0**
3	When recall successfully,the VFD will display”Recall data success!”.	**LIST** **Edit Recall Disable**

After recall,please enable the LIST state,then quit the menu and press ON/OFF to trigger the execution.

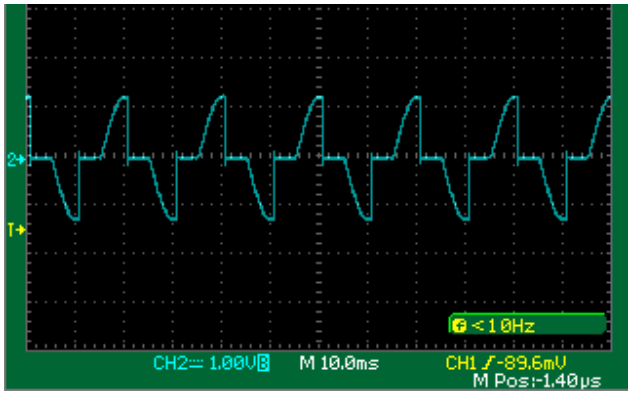
5.10.3 Dimmer

The leading and lagging edge of the waveform can by concealed and the phase angle set with Dimmer function to regulate the active power, thus adjusting the lighting intensity.

Dimmer of leading edge:



Dimmer of lagging edge:



Dimmer operation:

> Active dimmer function, set LeadingEdge /LaggingEdge

1	Press multiple keys (Shift)+ Select （Menu）to menu	**MENU** **System Config Info**
2	Press right arrow key to select “ Config”, press Enter to confirm when “Config” is shining	**CONFIG** **Volt-M*in* Volt-Max >**
3	Press right arrow key to “Dimmer” press Enter to confirm when “Dimmer” is shining.	**DIMMER** **LeadingEdge TrailingEdge Off**
4	Select “LeadingEdge” or “LaggingEdge” to active the function. Press Enter key to confirm when it is shining. Shining”*” indicate on VFD means dimmer function is in used, conversely,”*” disappeared.	**DIMMER** **LeadingEdge TrailingEdge Off**

> Set phase angle and start test

1	Press compound key (Shift)+ 9 （*Dimmer） and enter menu operation	OFF **9.0V 0.0mA 50.0** **Dimmer=30.0°**
2	Press numeric key to set angle, press Enter to confirm. Also you can adjust angle by knob to view real-time waveform changes along .	
3	Press Volt and numeric key to set voltage based on requirement. Press Enter	
4	Power source output dimmer wave with “*” shining.	

5.11 Output range

IT7320 series AC source will allow switchover between High range and Auto range. Take IT7321 as example, the voltage, current and apparent power at the High range is 300V/1.5A/300VA; the voltage, current and apparent power at the Low range is 150V/3A/300VA. Auto range refers to auto switchover mode between High range and Low range.

You can choose the range according to actual test requirements. When Auto range is chosen, the switchover between High range and Low range will be performed by the instrument automatically, thus sparing complicated operations such as manual setting.

Switch High range and Auto range:

Press (Shift) and Volt (High/Auto) together to switch between High range and Auto range. When High range is chosen, press the (Shift) and Volt (High/Auto) together to switch to Auto range. The indicator “Auto” on the VFD will be on.

Note: There is a temporary OFF to the AC source during the switchover of range

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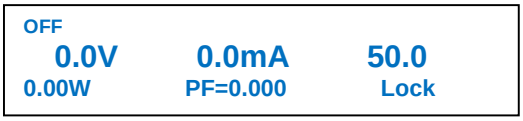
5.12 Key lock

The front panel keys can be locked to prevent unwanted changes to output settings and AC source configurations.Follow the steps below to enable/disable key lock.

Press ((Shift)+ On/Off （Lock）button to set the key lock state.If keyboard has been locked,the indicator light ”Lock” will display on the VFD .In addition,when keyboard are locked,all buttons can’t be used except ON/OFF key and (Shift) key. Press (Shift)+ On/Off （Lock） once again will relieve key lock function.



5.13 BNC

There is a composite terminal at the rear panel of the AC source(see description of rear panel), which can be used as:

1. Input signal:

I-Trigger: serve as input signal by external trigger. Connect the positive and negative end of the terminal to generate a trigger signal

I-On: serve as the control signal for On/Off. When the positive and negative end of the terminal is in short circuit, the status of AC source is On; when the circuit is open, the status of AC source is OFF

2. Output signal:

O-Sync: as synchronizing signal of alternating phase

O-On: as status signal for On/Off. When the status of AC source is ON, the terminal will output high level; when the status of power supply is OFF, the terminal will output low level

Before using BNC terminal,you need to define its function firstly by following steps below:

1	Press multiple key (Shift)+ Select （Menu）to menu operation.	**MENU** **System Config Info**
2	Press right arrow key and select “config”, press Enter key when “Config” is shining.	**CONFIG** **V-Min V-Max >**
3	Press right arrow key to BNC-Set and press Enter key when “BNC-Set” is shining.	**BNC PORT SETUP** **I-Trigger I-On O-Phase** **O-On >**
4	Press left and right arrow keys to select interface function and press Enter. Press ESC key to exit menu.	

Chapter6 Remote Operation Mode

IT7320 series AC source has three standard communication interface: RS232, USB, LAN.You can choose any one of them to communicate with PC.

6.1 RS232 interface

There is a DB9 connector at the rear of the power supply, when connect to computer, you need to select a cable with COM port on both side;
To active communication,you need to enable the settings in menu to be the same with the PC communication configuration.

Note：The RS232 settings must match the settings in front panel system information. If any change, please press (Shift)+ Select(Menu)key to modify the menu: SYST SET\COMM.

RS-232 data format

RS-232 data is a 10-bit word with one start bit and one stop bit.The number of start bit is not programmable.Stop bit is selectable between 1&2.Besides,you can set the parity bit in the menu using the front panel (Shift)+ Select key.
Parity options are stored in a non-volatile memory.

Baud Rate

The front panel (Shift)+ Select button allows the user to set baud rate which is stored in the non-volatile memory: 4800,9600,19200 38400,57600,115200

RS-232 connection cable

Adopt the RS232 cable with DB-9 interface because the serial port of RS232 can be connected with that of the controller (e.g. PC). The modulating cable of the air-conditioner is not recommended. The pins of plug are shown as the following table.
If your computer is provided with a RS232 interface with DB-25 plug, a cable and a adapter with DB-25 plug (one end) and DB-9 plug (the other end) are required (not the modulating cable of the air-conditioner)

RS-232 plug pins

Pin number	Description
1	No connection
2	TXD, transfer date
3	RXD, receive data
4	No connection
5	GND, ground
6	No connection
7	CTS, clear transfer
8	RTS, ready to transfer
9	No connection

RS-232 Troubleshooting:

In case of connection failure of RS232, perform following check:

Check if the computer and power supply are provided with same Baud rate, parity check bit, data bit and flow control. The power supply shall be configured with one start bit (fixed) and one or two stop bits.

Just as described in the RS232 connector, appropriate interface cable or adapter shall be adopted. Notes: even if the cable is equipped with right plug, internal wiring may be incorrect.

The interface cable must be connected to the right serial port (COM1 and COM2) of the computer.

Communication Settings

Before communication, you should first make the following parameters of power supply and PC matches.
Baud Rate: 9600 (4800,9600,19200,38400,57600,115200). You can enter the system menu from the front panel, and then set the baud rate.
Data bits: 8
Stop Bits: 1
Calibration (none, even, odd)
EVEN 8 data bits, have even parity
ODD 8 data bits have odd parity
NONE 8 data bits, no parity
Local Address: (0 ~ 31, the factory default setting is 0)

Parity=None	Start Bit	8 Data Bits	Stop Bit

6.2 USB interface

Connect the power supply and the computer using a cable with two USB interfaces (each end). All functions of power supply may be programmed through USB.

The functions of USB488 interface are as follows

- 488.2 USB488 Interface.
- Receive requests of REN_CONTROL, GO_TO_LOCAL and LOCAL_LOCKOUT.
- Receive the command MsgID=TRIGGER USBTMC and convey the TRIGGER command to the functional layer.

The functions of USB488 component are as follows:

1. Able to read all compulsory SCPI commands.
2. SR1 enabled.
3. RL1 enabled.

DT1 enabled.

6.3 LAN interface

Press (Shift) + Select (Menu) on the front panel together to access the menu. Select LAN in the Communication from System and then configure Gateway, IP, Mask and SocketPort in the LAN option.

Connect the LAN interface of power supply to the computer with a reticle (crossed).

6.4 GPIB interface

Use a IEEE488 bus to connect GPIB interfaces of power supply and PC. Please ensure that the screws have been screwed down in order to have a full connection. Then press Shift + OVP (Menu) to enter the system menu to set the address. The address range of power supply is 0-31.After you set the address, please press Enter button to confirm, GPIB address is saved in nonvolatile memory.

Support process

If you have a problem, follow these steps:

1 Check the documentation that come with the product

2 Visit the ITECH online service Web site is www.itechate.com ,ITECH is available to all ITECH customers. It is the fastest source for up-to-date product information and expert assistance and includes the following features :

Fast access to email AE

Software and driver updates for the product

Call ITECH support line 4006-025-000